



FIR FILTER

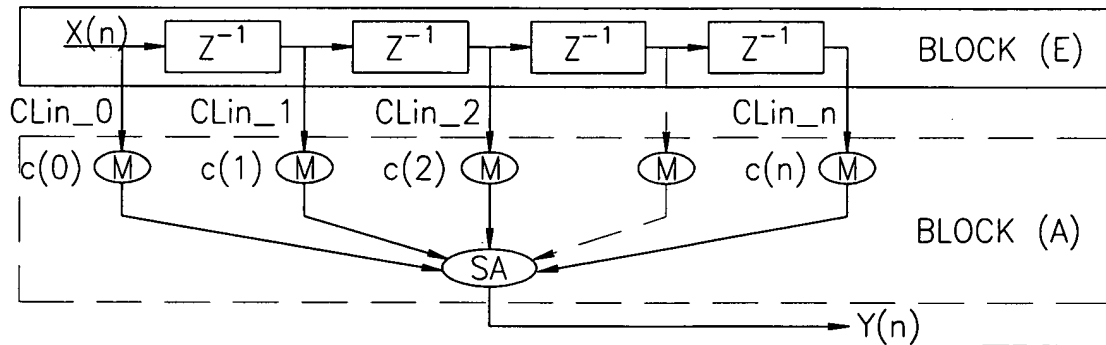


FIG. 1A

IIR FILTER

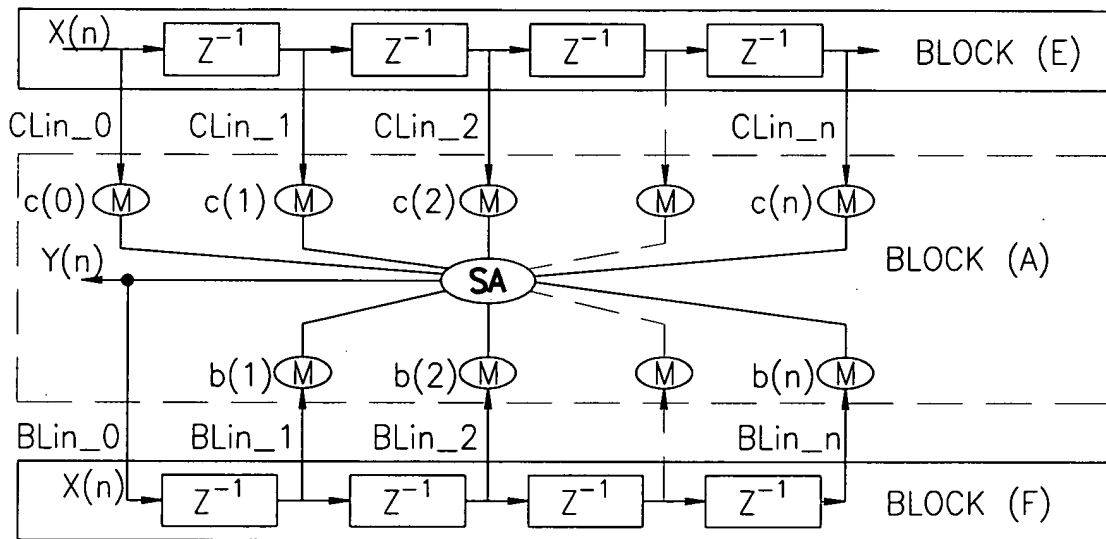


FIG. 1B

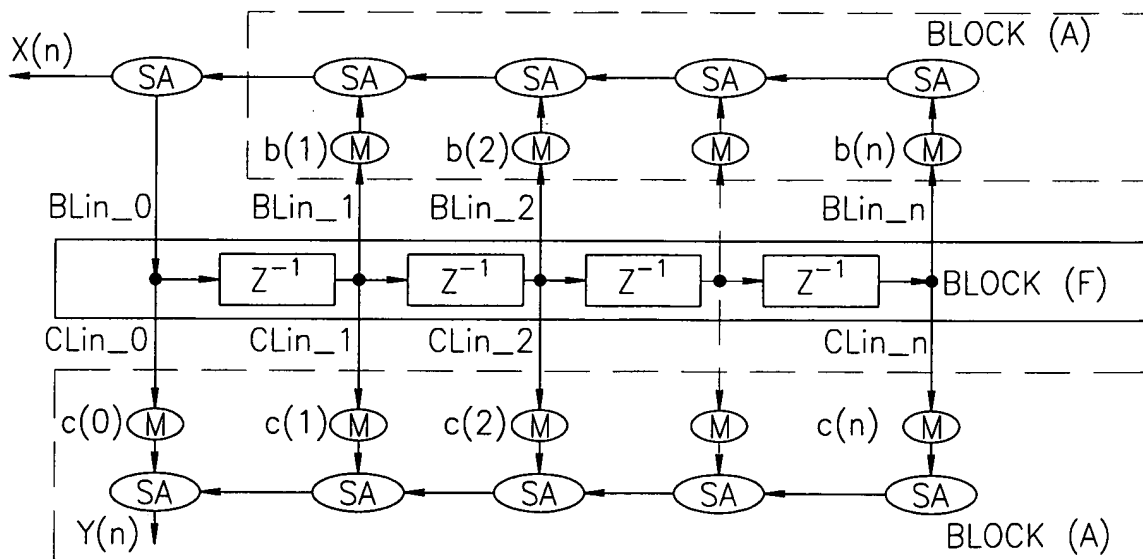
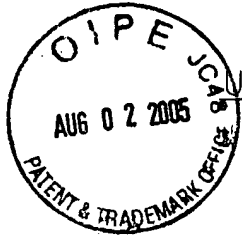


FIG. 1C



BIT SERIAL ELEMENTS/COMPONENTS

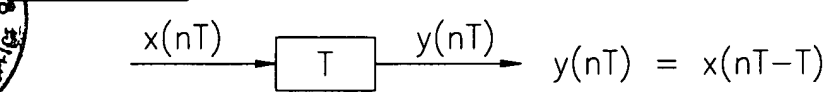


FIG. 2A

FULL ADDER

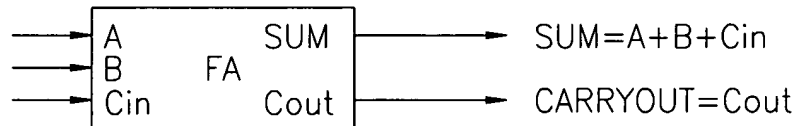


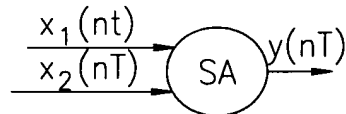
FIG. 2B

FULL SUBTRACTOR



FIG. 2C

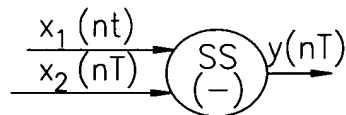
SERIAL ADDER



$$y(nT) = x_1(nT) + x_2(nT)$$

FIG. 2D

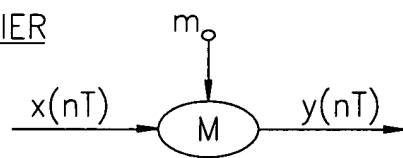
SERIAL SUBTRACTOR



$$y(nT) = x_1(nT) - x_2(nT)$$

FIG. 2E

MULTIPLIER



$$y(nT) = m * x(nT)$$

FIG. 2F

DELAY

INPUT FRAME SIZE = X BITS (E.G INPUT IS 1010101 OR X=7 BITS)

TO STORE X BIT FRAME, NUMBER OF T ELEMENT
USED IN X OR 7 IN PRESENT CASE

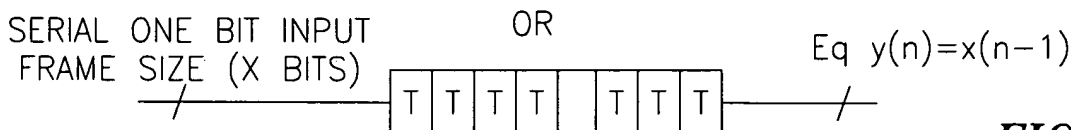
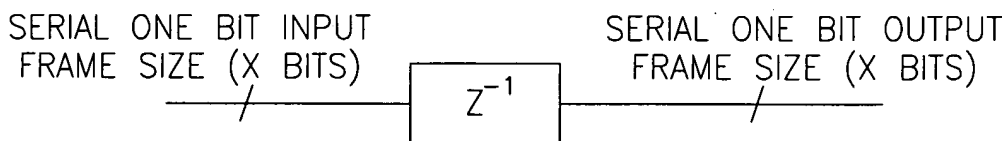
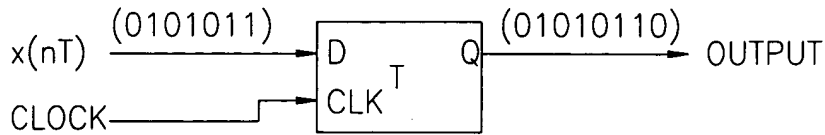


FIG. 2G



UNIT DELAY

*FIG. 3A*

INPUT FRAME INPUT PATTERN (0101011) IS COMING SERIALLY AT $x(nt)$ PIN AT CLOCK RATE SPECIFIED ON CLOCK PIN

FULL ADDER (FA) / FULL SUBTRACTOR (FS)

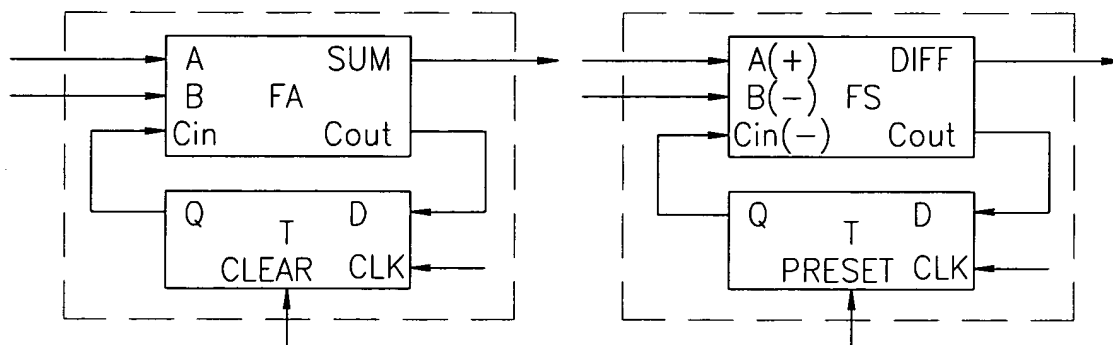
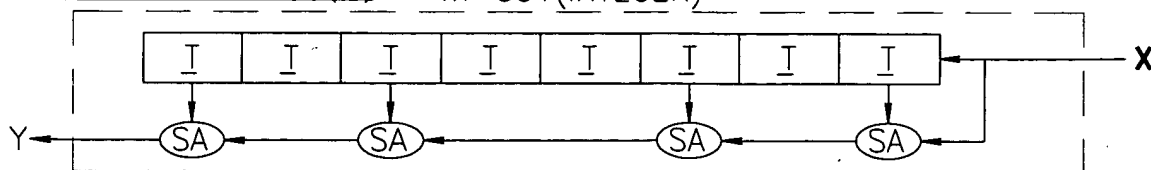
BINARY ADDITION/SUBTRACTION COMPONENTS IS REALIZED USING FOLLOWING TRUTH TABLE

TRUTH TABLE-FULL ADDER

A	B	Cin	Z	Co
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

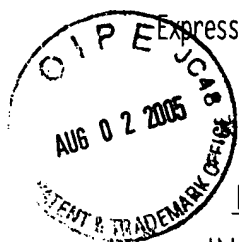
TRUTH TABLE-FULL SUBTRACTOR

A	B	Cin	Z	Co
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

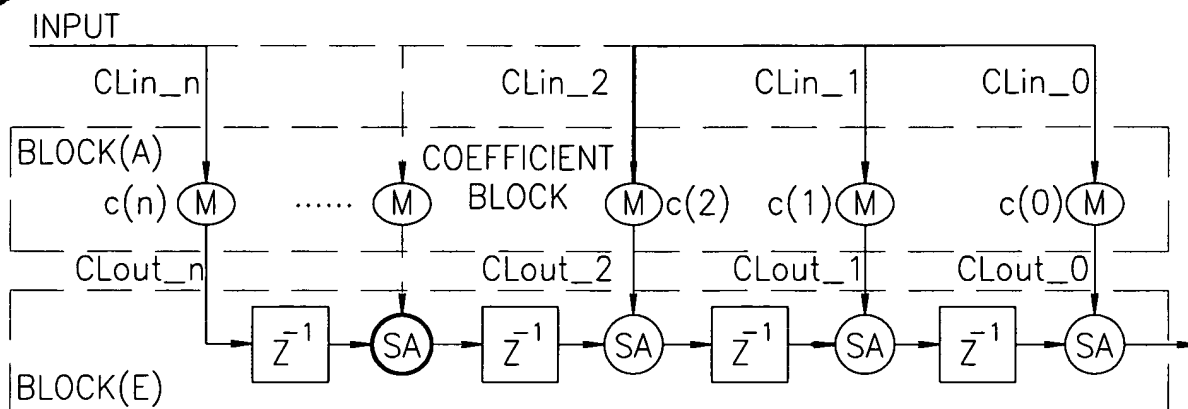
*FIG. 3B*SERIAL ADDER (SA) / SUBTRACTOR (SS)*FIG. 3C*SERIAL MULTIPLIER(M) $m=331$ (INTEGER)

BIT MULTIPLIER COEFFICIENT SIZE IN THIS EXAMPLE IS 331 (BINARY 101001011)

FIG. 3D



IMPLEMENTATION 1



REALIZATION OF COEFFICIENT USING SHARE-ABLE MULTIPLIER (COEFF.=3.11)

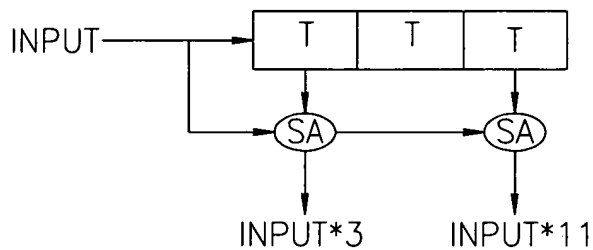


FIG. 4A

IMPLEMENTATION 2

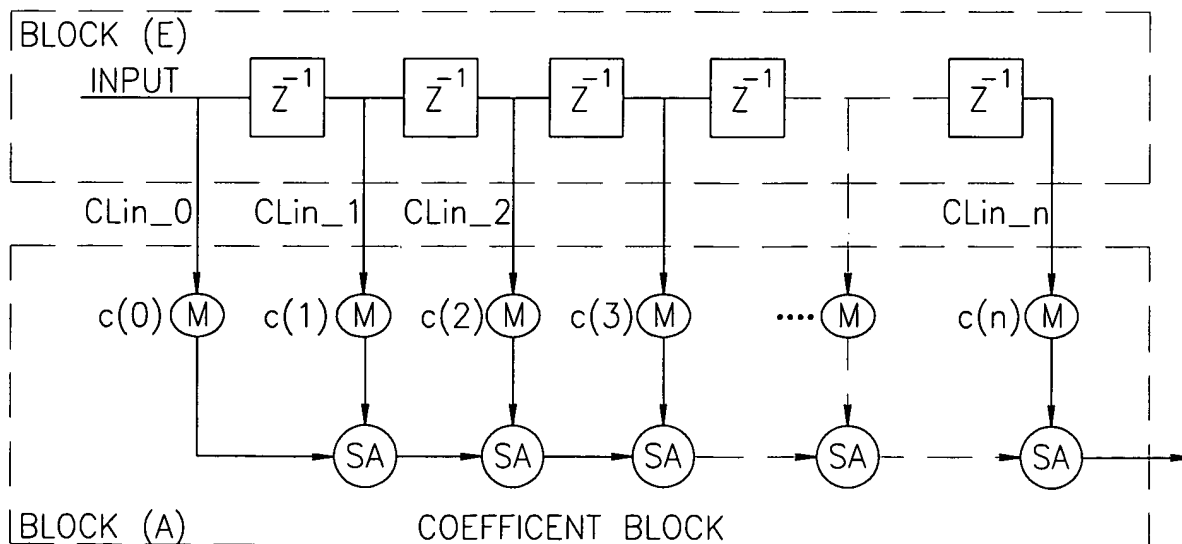


FIG. 4B

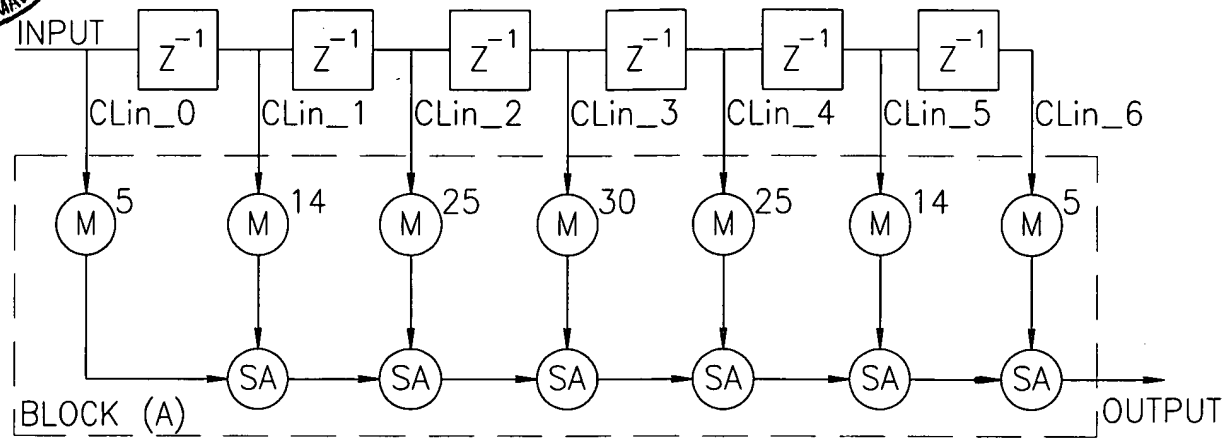
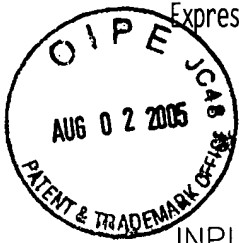


FIG. 5
PRIOR ART

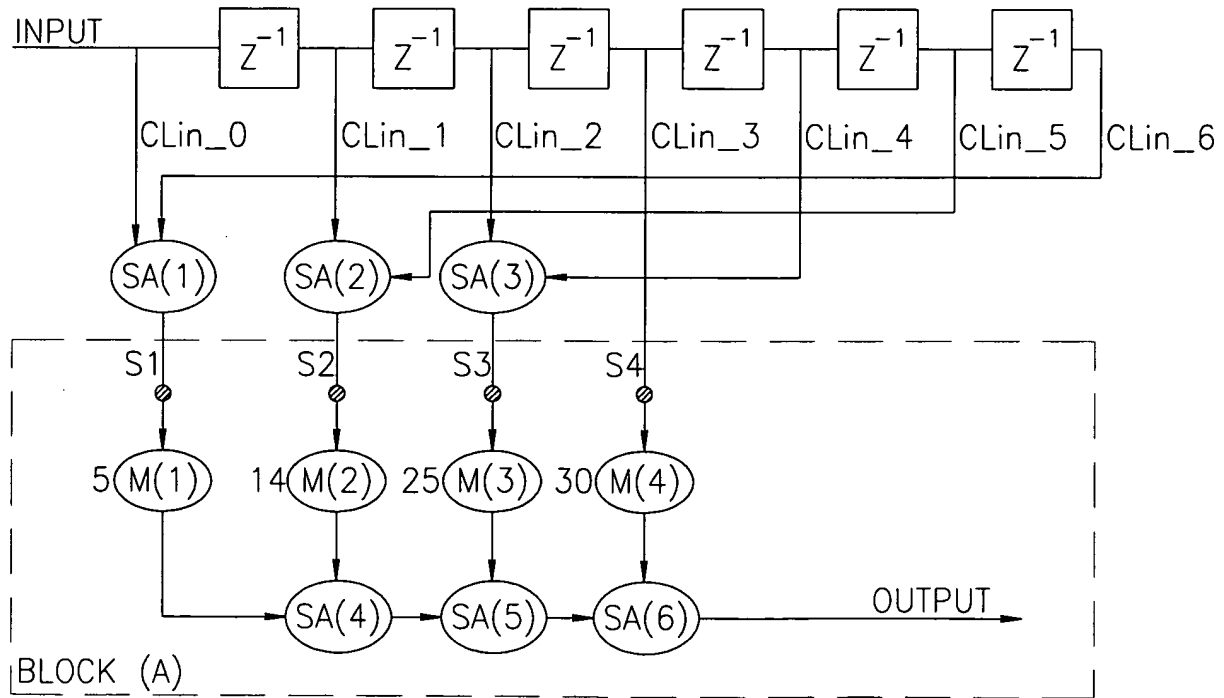


FIG. 6
PRIOR ART

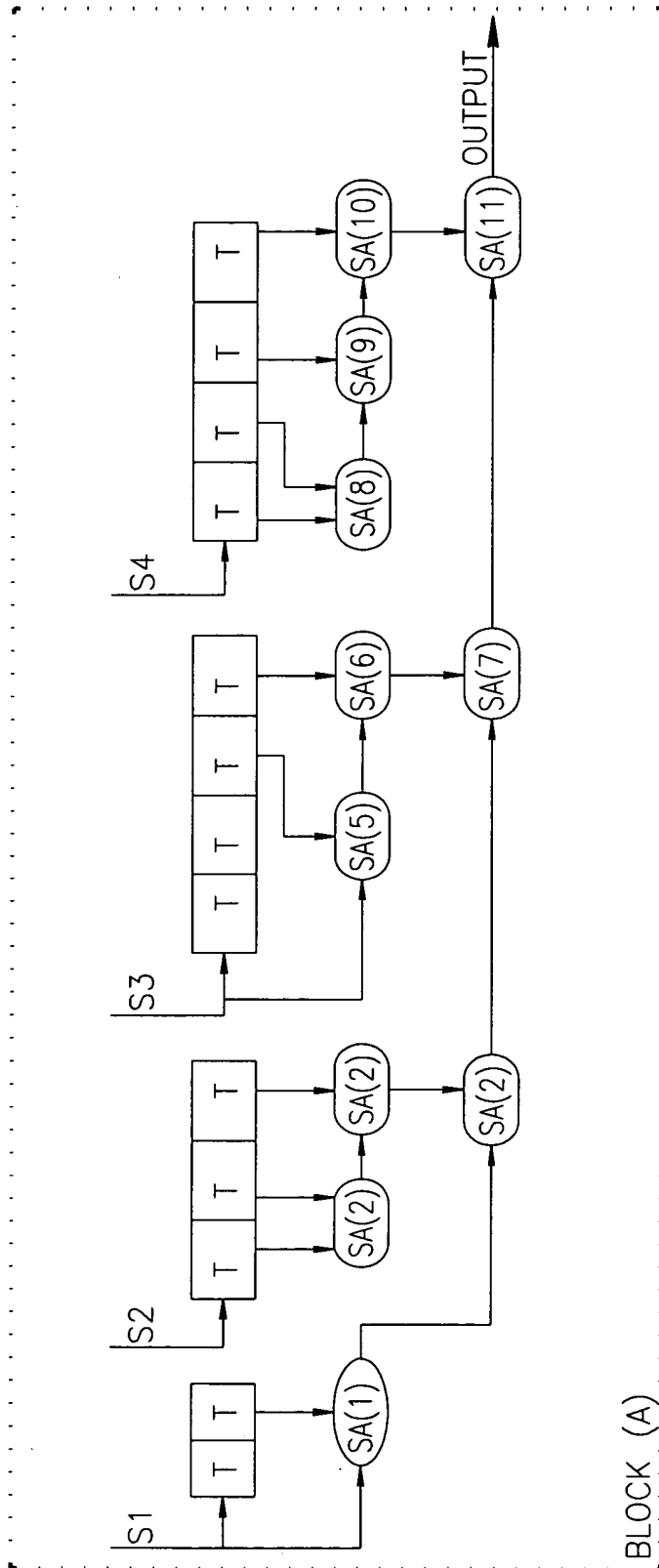
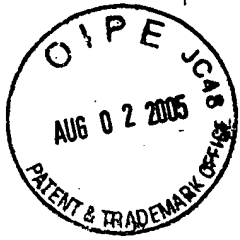
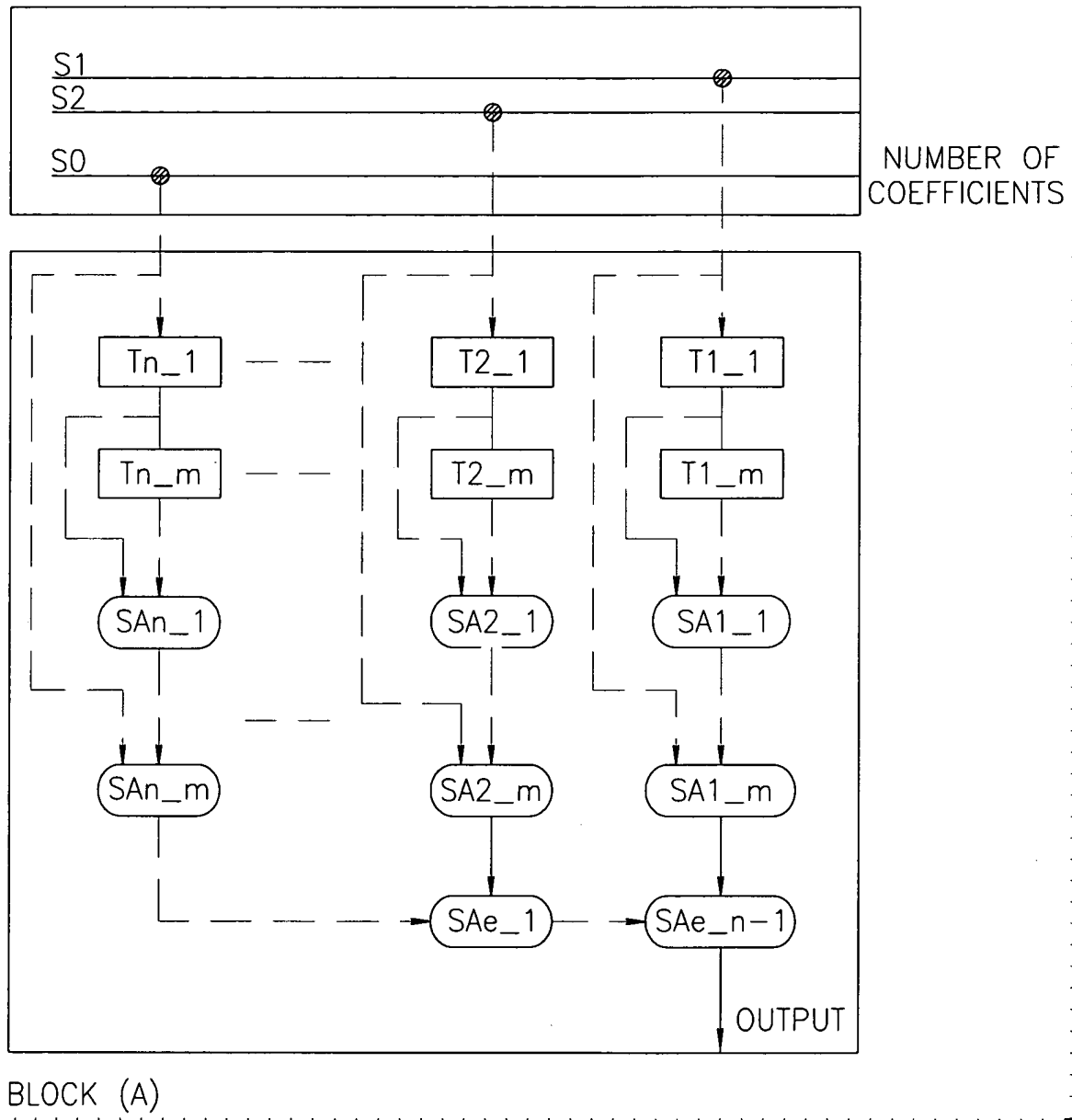
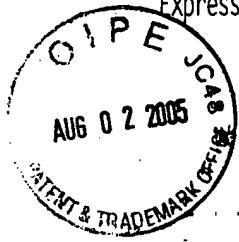


FIG. 7
PRIOR ART



- A) APPROX. NUMBER OF SA = NUMBER OF COEFFICIENT * (MAX COEFF SIZE / 2)
 B) FLIP-FLOP (T) ARE NOT SHARABLE
 APPROX. NUMBER OF FLIP-FLOPS = NUMBER OF COEFF * (MAX. COEFFICIENT SIZE / 2)

FIG. 8
 PRIOR ART

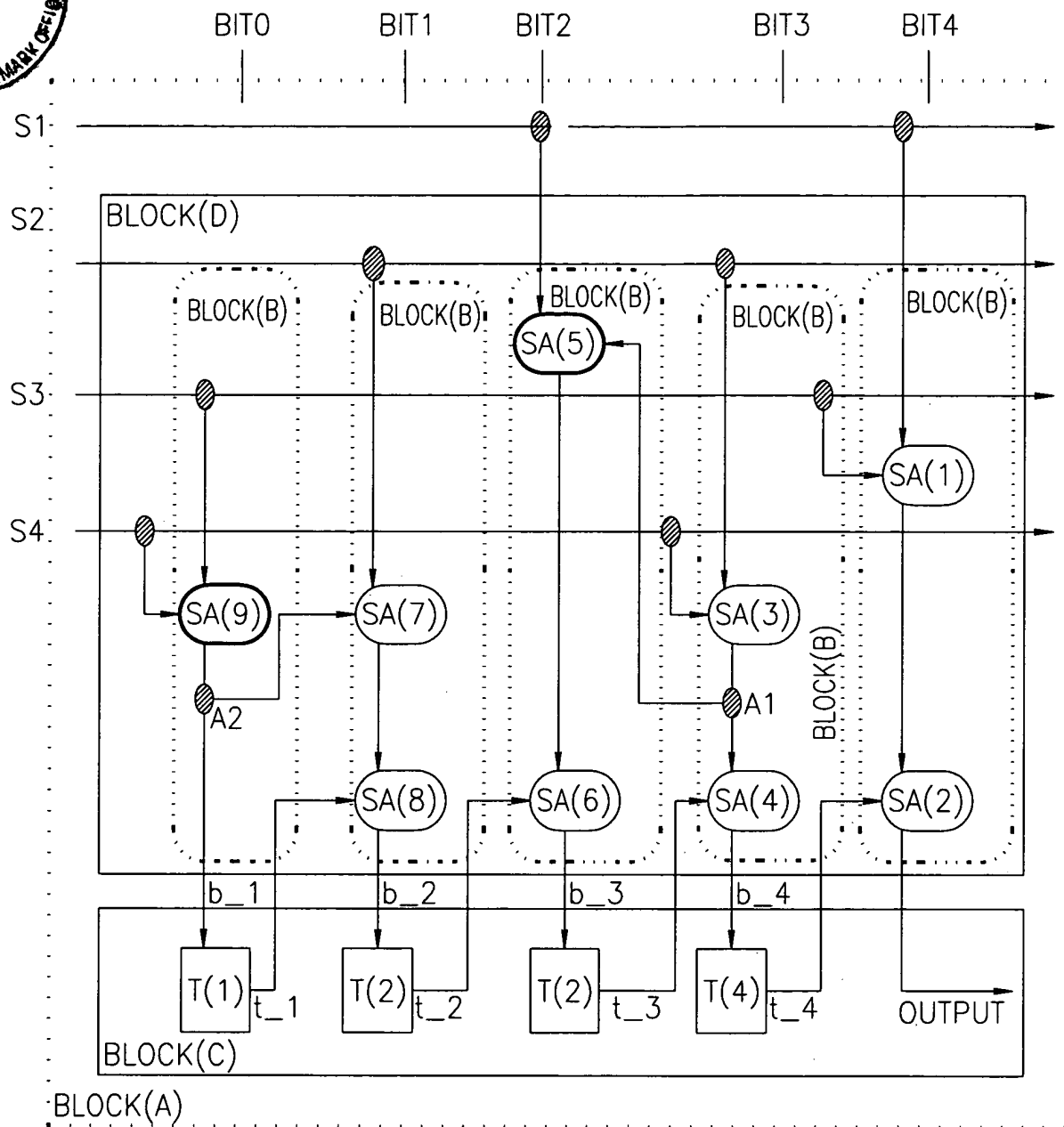
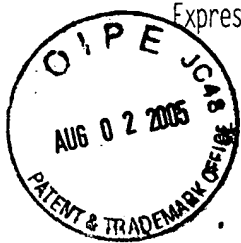
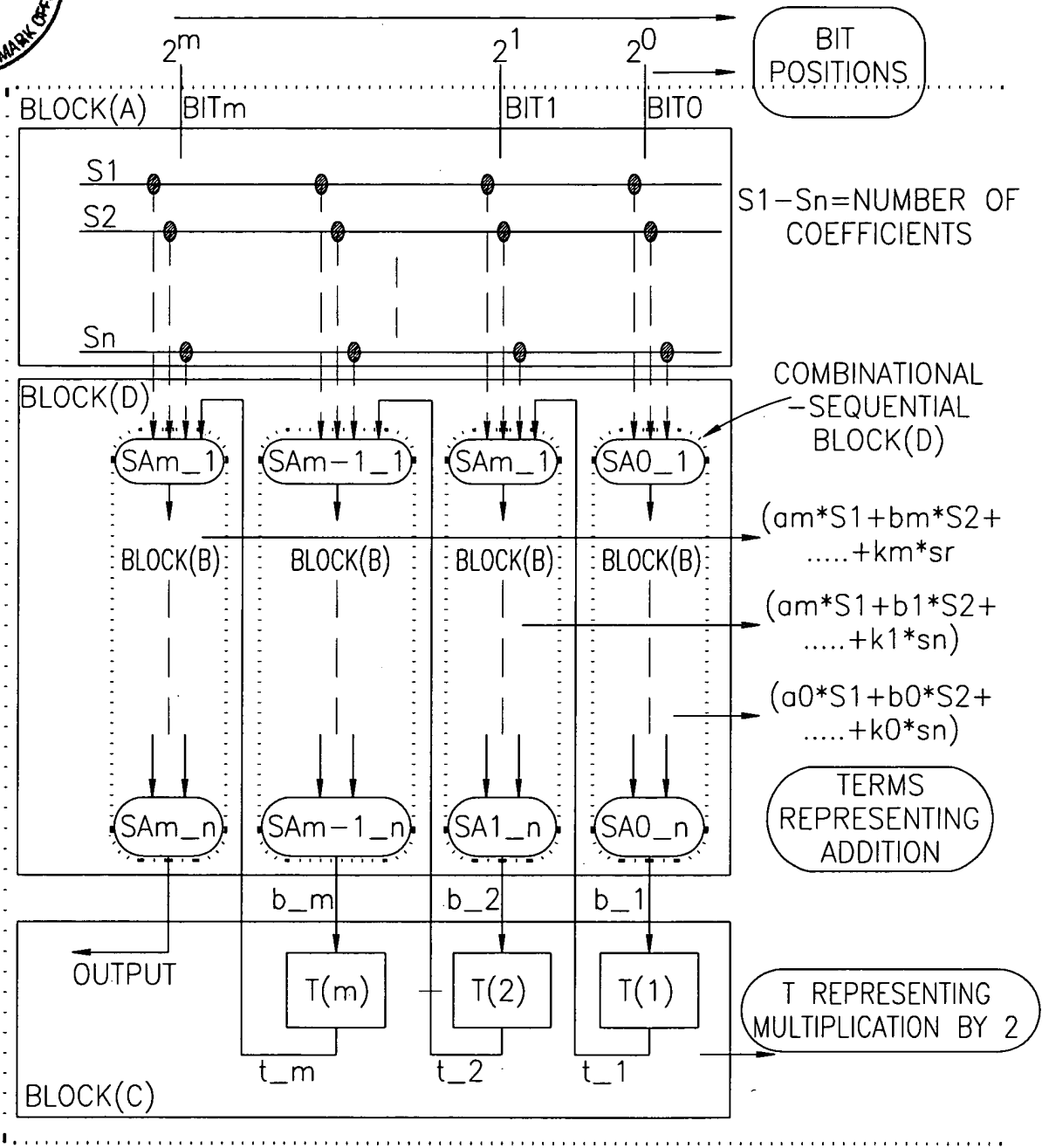


FIG. 9



APPROX. NUMBER OF SERIAL ADDERS = (NUMBER OF COEFFICIENT MAX COEFF SIZE / 2)
 NUMBER OF FLIP - FLOPS(I) = SIZE OF MAXIMUM COEFFICIENT

FIG. 10

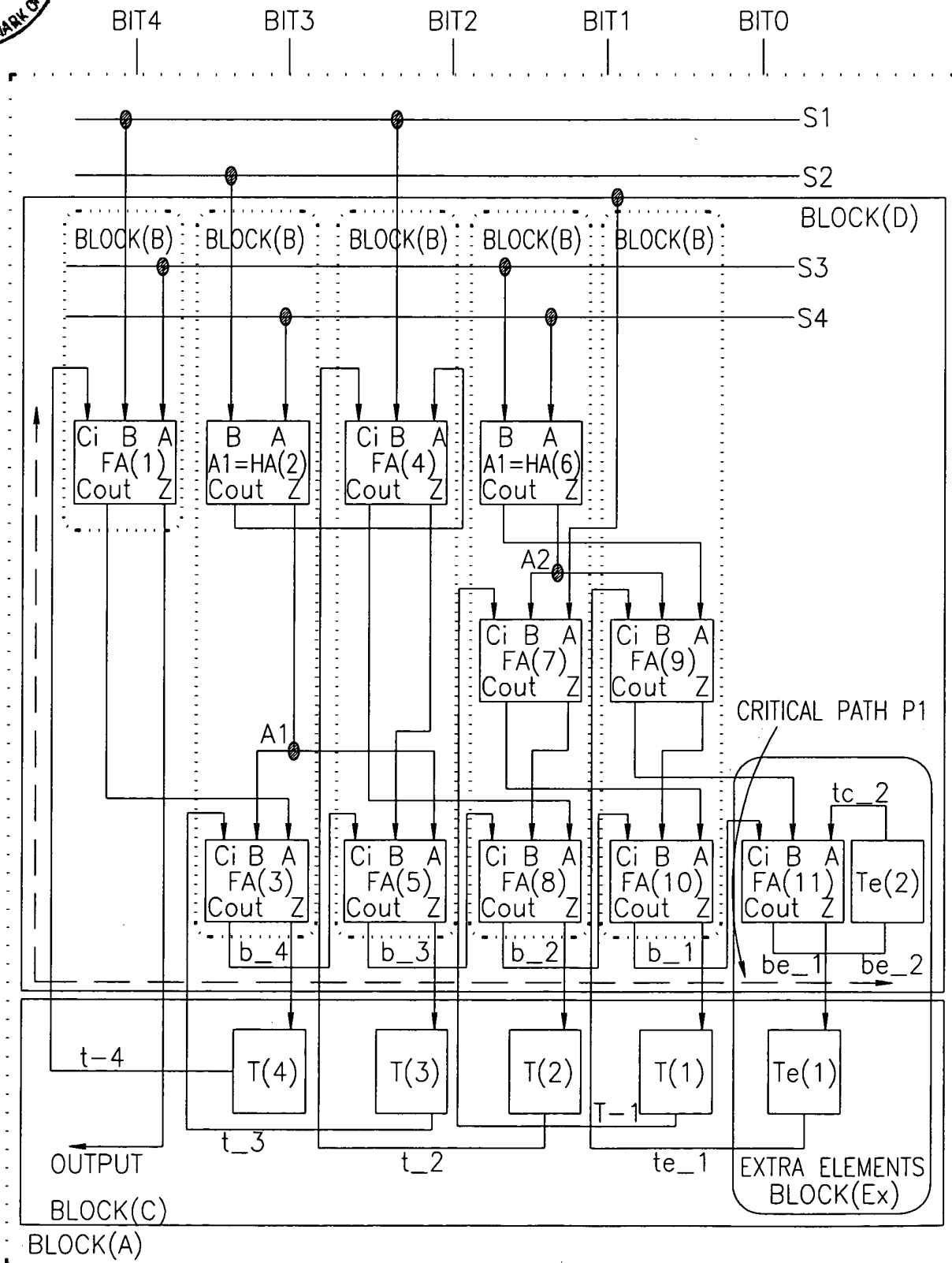
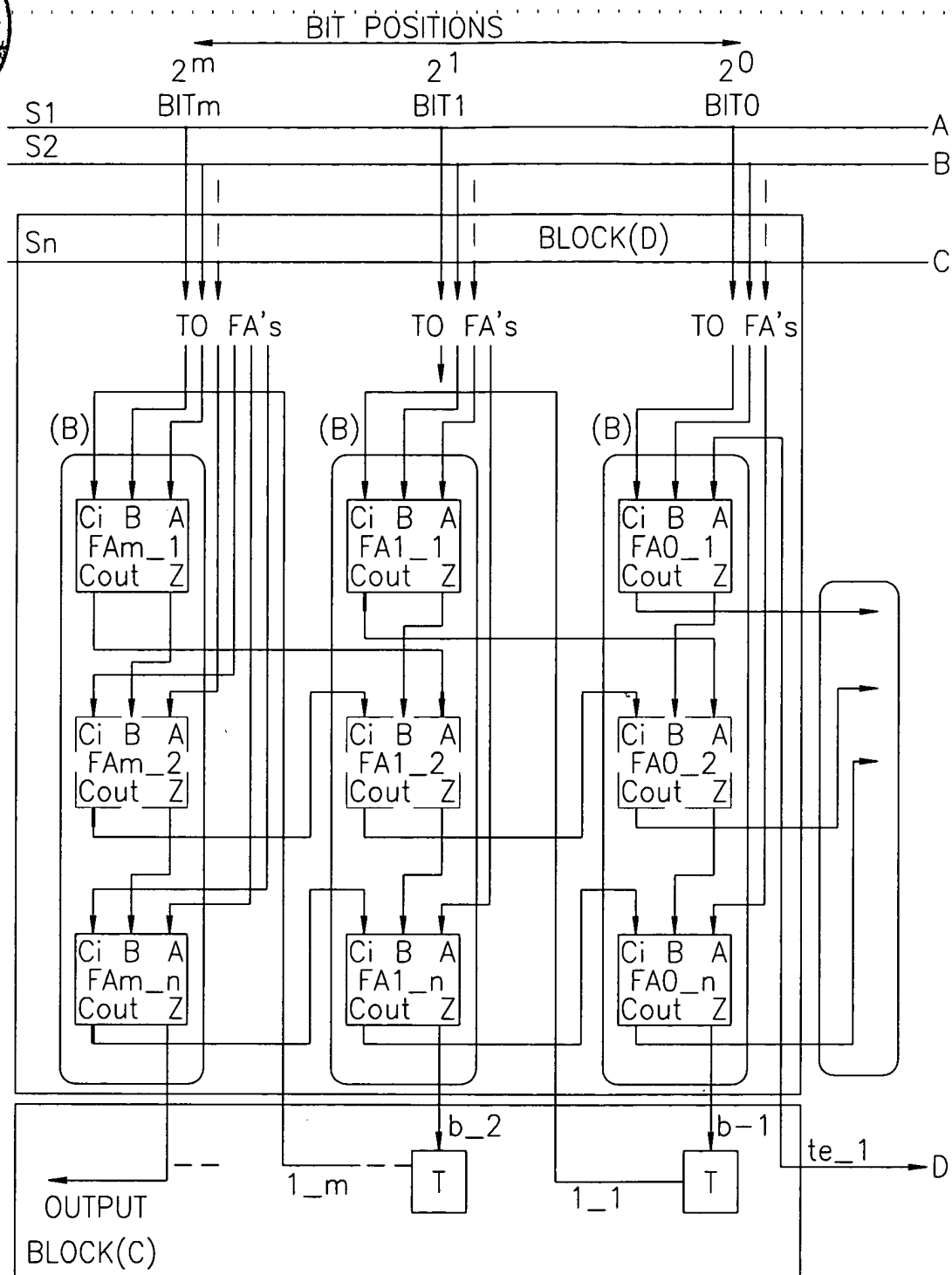
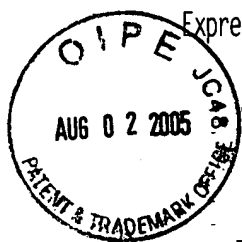


FIG. 11



NUMBER OF FLIP-FLOPS = MAXIMUM SIZE OF COEFFICIENT

NUMBER OF ADDERS = <NUM. OF COEFF. MAXIMUM COEFF. SIZE / 2

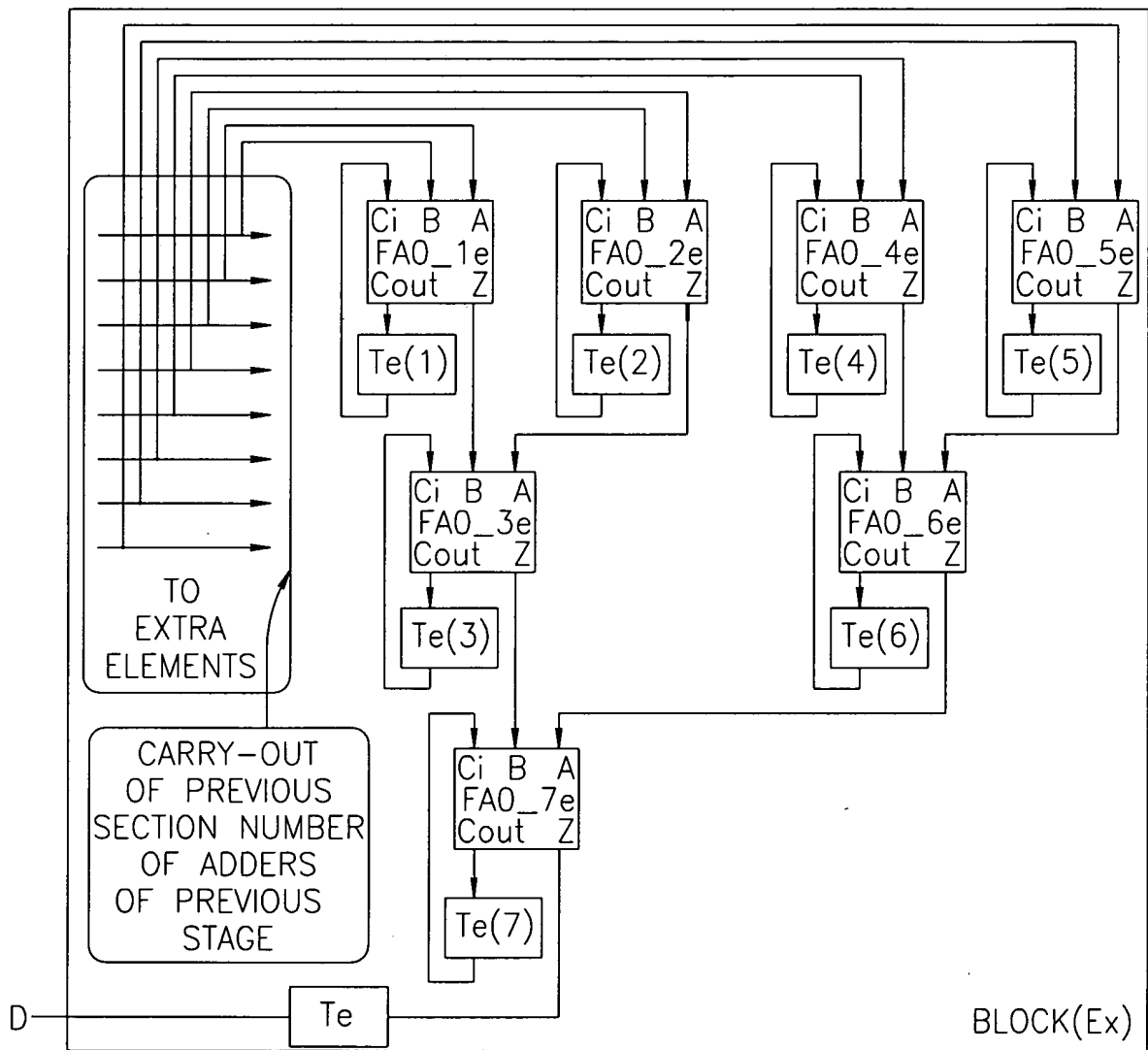
BLOCK(A)

FIG. 12A



A _____
B _____

C _____



EXTRA ELEMENTS

NUMBER OF T- ELEMENTS = NUMBER OF ADDERS OF LAST STAGE
NUMBER OF FA- ELEMENTS = NUMBER OF ADDERS OF LAST STAGE-1
AN EXAMPLE II NUMB. OF ADDERS IN PREVIOUS STAGE - B,
NUMBER OF T-ELEMENTS, FA-ELEMENTS = 8, 7 RESPECTIVELY.

BLOCK(A)

FIG. 12B

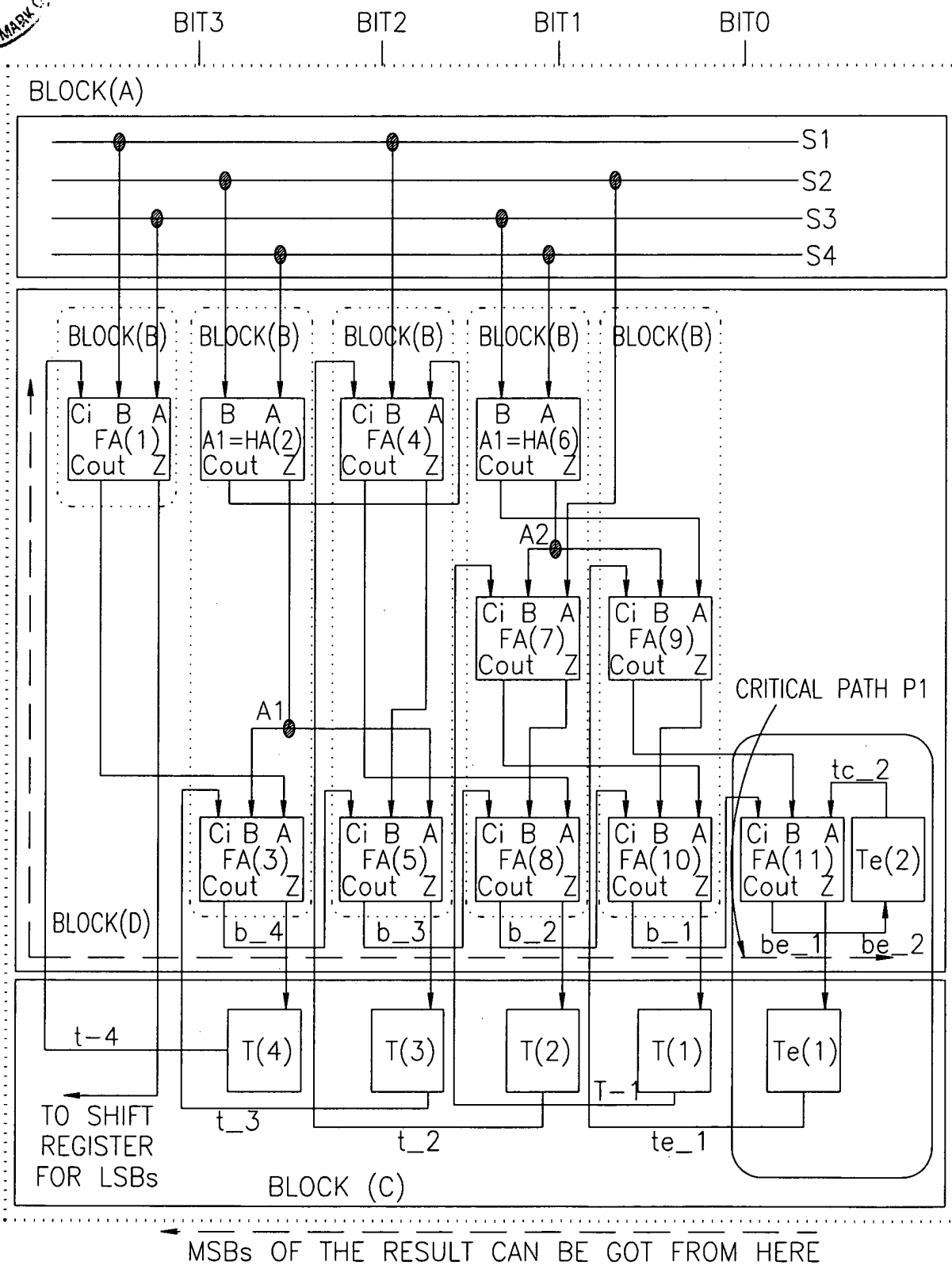


FIG. 13